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ABSTRACT

A study investigated the distribution of education levels in Tennessee's counties and examined factors affecting that distribution. It considered first the impacts of the changing global economy on Tennessee and the implications for education. The study found that Tennessee was likely to be harder hit than most states because of its dependence on manufacturing and the resurgence in rural poverty. Concern about adult literacy was generated by the demands of a changing economy and changing jobs. Study findings showed that education levels were very unequally distributed in Tennessee. Income levels were closely associated with the variation in education levels, with counties with higher per capita incomes consistently having higher proportions of high school graduates. The more rural counties tended to have lower education levels. The distribution of kinds of jobs was perhaps the most important factor associated with education levels. The trade, service, and construction industries were positively correlated with the percentage of high school graduates. The presence of a high proportion of manufacturing industry in a county had negative implications for education. The presence of substantial numbers of white collar jobs in a county ensured higher education levels. Positive correlations were found between local spending on education and the percentage of high school graduates. Jobs and income were closely linked with education. (YLB)

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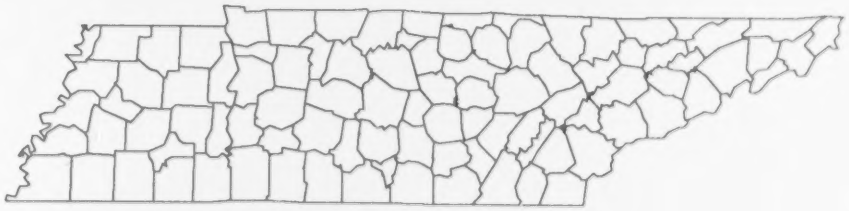
An Even Chance

Education, Community and Work in Tennessee



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Contents

Preface 5

Summary of Main Findings 7

Introduction 9
- Literacy 9
- Workforce Literacy 9
- Economy 10
- Education 11
- Education and Jobs 12

Findings 14
- Education 14
- Personal Income Data 15
- Population Data 17
- Economic Base 22
- Tax Base and Local Education Spending 28

Conclusions 31

List of Tables and Figures

Tables

1. Personal Income Correlations 15
2. Population Data Correlations 19
3. Industry Correlations 24
4. Occupation Correlations 26
5. Local Tax Base Correlations 28

Figures

1. Adults without a High School Diploma, 1980 11
2. Percent High School Graduates by Mean Per Capita Income 16
3. Annual Per Capita Personal Income for 1985 and Percent of Adults without a High School or GED Diploma in 1980 17
4. Percent High School Graduates by Average Weekly Wages 18
5. Percent High School Graduates and Poverty Rate 18
6. Percent High School Graduates and Percent Population Living in Urban Areas 20
7. Education Levels for Selected Counties 21
8. Percent High School Graduates and Percent Non-White Population 22
9. Years of Education by Age 23
10. Industry Mix for Counties Grouped by Percent of High School Graduates 25
11. Occupation Mix for Counties Grouped by Percent of High School Graduates 27
12. Percent High School Graduates and Local Spending on Schools 29

Preface

This report sets in context the statewide debate about adult literacy in Tennessee. We look across the state, at all 95 counties, and examine correlations between economic and social variables and education levels.

Behind the picture this report paints of Tennessee in the 1980's lie looming global changes. The world economy is changing. Companies have the capacity to manufacture goods far from consumers. Even some service activities can be conducted overseas. Just as jeans are made in Mexico, electronics in Korea and cars in Brazil, so some insurance companies are processing claim forms in Ireland.

These changes have profound implications for Tennessee, both in economic and social terms. The job market is changing. Jobs are disappearing, because of industrial relocation overseas, or automation. Some metropolitan areas are doing well economically, and growing in population. But rural areas face an uncertain future.

Attention is now focussed on the links between education and the economy. 'Workforce literacy' dominates debate. Many involved in economic development see better education and skill training of the workforce as the essential key to making the U.S. competitive in the world economy. Many educators are beginning to see jobs, industrial needs and corporate demands as driving educational programs.

At the Center for Literacy Studies we view these changes with both interest and concern. As an interdisciplinary research center with a focus on adult literacy, our major concern is with those at the bottom, those who have the lowest educational skills in our society, and who are often also disadvantaged in many other ways—by gender, race, region, economic status. The current national interest in adult literacy spells both opportunity and danger for them. It is an opportunity to gain access to an educational system which has served them poorly in the past, and an opportunity to take part in new educational approaches which will work better.

There is also a danger that education will focus on narrowly defined job skills rather than education for 'citizenship,' full participation in the social and political as well as economic life of the state. There is a danger that programs will focus on those easiest to reach and most likely to succeed, leaving out once again the most disadvantaged. There is a danger, perhaps especially in rural Tennessee, that jobs will be held out as the promise, the incentive, for those embarking on education and training, but that the jobs will not be there in the end.

To grasp the opportunities and avoid the dangers we need serious research and broad-based public debate. We see this report as a small contribution to that research and debate. It leaves many questions unanswered, which we hope further research will illuminate. It is a step along the way of an important process: that of understanding ourselves and preparing for the future, as best we are able.

The Center for Literacy Studies is a multi-disciplinary research center at The University of Tennessee. The Center's goal is to initiate and encourage research in many fields to further our understanding of literacy, its context and implications for our society, and to provide a more sound basis on which programmatic decisions may be made. The Center is funded by a grant from the Tennessee Department of Education and the Knoxville News Sentinel Company.

Special thanks for assistance with the analysis for this report to Dr. Timothy J. Pettibone, College of Education, Dr. Mike Smith, Psychology Department, and Dr. Don Ploch, Sociology Department. Thanks to Sue Carey, College of Education, for the report layout.

Summary of Main Findings

Major changes in the national and global economy are causing a 'literacy crisis' in this country. American industries are restructuring in a number of ways, including automating domestic plants, or relocating overseas in order to lower labor costs. The changes may place increasing skill demands on some of the American workers who remain, while technological changes may be de-skilling for others.

These changes have particular impact for Tennessee because the state is heavily dependent on manufacturing jobs. We are seeing plant closings and major layoffs across the state. Although new plants are continuing to open, they often demand higher skills and qualifications than the old.

Manufacturing workers displaced in the restructuring may face difficulty in getting a new job at comparable wages, as the numbers of jobs in manufacturing decline. Too often they can find only part-time work in the service sector at lower pay, and lose benefits.

The situation is of particular concern to Tennessee, not only because of its comparatively large proportion of manufacturing workers, but also because it is one of the Southern states with the lowest adult education levels in the nation. A comprehensive education and job training program may be of particular importance for Tennessee's economic future.

This report looks at the existing pattern of education levels among adults in all 95 Tennessee counties, and at how social and economic factors interact with education. If we are to plan effective strategies for development, we need to deepen our understanding of the complex inter-relationship of factors that are linked with education, especially jobs and income.

Education levels are very unequally distributed in Tennessee.

The percentage of adults over 25 with a high school diploma in Tennessee counties ranges from just over 30 percent to over 70 percent. While state-wide, 56 percent of adults have a high school diploma, in 70 of Tennessee's 95 counties, more than half of all adults lack a high school diploma.

Income levels are closely associated with the variation in education levels.

Counties with higher per capita incomes consistently have higher proportions of high school graduates among their adult populations. They also have lower proportions of adults with less than eight years of schooling. Average weekly wages also correlate closely with education levels, although somewhat less strongly than does per capita income.

The poverty level in a county correlates more strongly than does average income level with the proportion of adults who have the least education, having completed less than 5 years of school.

The more rural counties tend to have lower education levels.

Tennessee is a rural state: 40 percent of its total population is rural. The more rural a county is, the more likely it will have a smaller proportion of high school graduates. 'Ruralness' is clearly a key factor influencing not only education but many other aspects of life in Tennessee counties. We found rural counties to be poorer, to have a narrower range of kinds of jobs, lower tax bases and lower school spending. All of these factors may contribute to the lower education levels in many rural counties.

The distribution of kinds of jobs may be the most important factor associated with education levels among Tennessee adults.

The retail trade industry serves in some ways as a barometer of economic health. Counties which have a higher proportion of retail trade in their local economies tend to be more urban, to have more white collar and substantially fewer blue collar workers, and have more population growth. The higher the proportion of both trade and service industries in a county, the higher the proportion of high school graduates among its adults. The construction industry is also positively correlated with percent high school graduates and negatively with the lowest education levels.

The presence of a high proportion of manufacturing industry in a county on the whole has negative implications for education.

The more manufacturing, the fewer high school graduates, and the more people with some high school education but no diploma. However, manufacturing counties tend not to have the highest proportions of those at the lowest educational levels, less than eighth grade or less than fifth grade education. The requirements of skilled and semi-skilled factory work in the past has seemed to encourage some education but less than optimal levels. Counties with more manufacturing industry also tend to be more rural, and therefore have fewer white collar and more blue collar workers, less trade and service industry, and have a lower property tax base.

The presence of substantial numbers of white collar jobs in a county assures higher education levels among adults.

When we combine the two white collar occupation groups, the combined variable correlates more strongly with percent of high school graduates than any other. The higher the proportion of executives and sales people, the higher the proportion of high school graduates, and the lower the proportion of those at the bottom of the educational scale, those with less than 5 years of formal education.

Conversely, the presence of substantial numbers of blue collar workers — even skilled production and craft workers — is strongly associated with a lower proportion of adults with a high school diploma.

The local share of expenditures on schools is associated with the proportion of high school graduates among a county's adults.

We found positive correlations between local spending on education and percent high school graduates among the adult population. Local spending on education also correlates, though a little less strongly, with the proportion of adults with the lowest education, such that the higher the local share of school spending, the lower the proportion of adults with fewer than five years of schooling. Higher school spending also correlates with higher per capita income and a higher proportion of white collar workers. Clearly, local expenditures on education are only one among a number of factors that impinge upon the education profile of a community.

Jobs and income are closely linked with education.

The per capita income and types of jobs in a community are closely linked with the education levels of adults, although our analysis does not allow us to define causal relationships. There is a clear need for further research at both the statistical and case-study levels, in order to explore these relationships in more depth.

Our study indicates that economic development and education need to be more closely connected. Programs need to take a multi-faceted approach to community development. Merely increasing education levels may not create jobs. But conversely we cannot create jobs in a vacuum, without making sure that people in the community have the skills they need to get the new jobs. Education can become part of the process of developing local resources to meet local needs — the 'human capital' approach to economic development.

Despite the need for closer connection between economic development and education, narrow job-defined skill demands should not drive education programs. Such skills will be outdated soon. Rather we need to establish education to develop broad basic skills, the capacity to continue to learn, and foster creative and critical thinking. Through this kind of education, people can become their own agents for economic renewal in their communities.

We need to establish an environment for all Tennesseans in which continuing education is encouraged, facilitated and valued. We not only need educated workers, but also citizens who can take a full part in the social, political and economic life of their communities and their state.

Introduction

Literacy

'Illiteracy' has a lot of emotional potency. Governor DiPrete of Rhode Island has described illiteracy as the 'python with a potential death grip on the profitability of American industry.'[1] In less striking terms, it has also been called the 'subtle danger,'[2] the 'most seriously neglected national priority.'[3] Campaigns are launched to 'fight,' 'wipe out,' 'erase' and 'eradicate' illiteracy. Analogies are drawn from the world of disease and war. In the popular press, illiteracy takes the rap for all manner of social ills: from teenage pregnancies to crime, from homelessness to unemployment.

Illiteracy is also blamed for most of the late twentieth century problems of the American economy. If workers were better educated, so the argument goes, American industry would be more competitive in the world economy. It is ironic that those who historically have been denied full access to quality education are now deemed to be at fault for not being better educated. It is the latest version of 'blame the victim.'

What, then, is 'literacy'? Literacy is a continuum of skills. Some people are more 'literate' than others, but it really is not possible to speak of literates and illiterates as if they were two distinct groups of people.

Literacy has been defined as 'the ability to use written and printed information to function effectively in one's society, to achieve one's goals and to develop to one's potential.'[4] This definition, similar to those used by Hunter and Harman,[5] and by UNESCO, focuses on the context of literacy. It is the ability to act effectively in a particular context. We all have experienced being less literate in a particular contexts: reading the new W-4 form instructions, an insurance form, or federal tax guides.

Literacy, then, is the ability to act as needed in a range of settings. It is related not only to work, but to a person's ability to 'function in society,' to make decisions, choices and judgements for themselves. It has a lot to do with being a citizen in an advanced industrial nation.

Literacy is not static, but an ability that increases with use. People may be able to function within the range of their daily needs—to read what they need to at work, in getting around their community, in the grocery store or at home—but not score well on standardized reading tests. Context and use are important aspects of literacy skills.

Although literacy represents skills relating to all spheres of life, the major focus today is on literacy skills on the job. Concerns about jobs, standards of living, and a changing world economy lie behind the 'literacy crisis,' and dominates discussion in adult literacy education.

Workforce Literacy

In essence, the workforce literacy arguments are that today's American workers lack the skills needed to meet the changing technological demands of the workplace. Tomorrow's workforce is even less likely to be able to meet these skill demands because of an increasing percentage of those least educated—women, minorities and immigrants—in the workforce during the next decade. Studies like the Hudson Institute's *Workforce 2000* suggest that more people are going to need increased skills for tomorrow's jobs.[6]

It is not so much that the skills of the workers are declining as that the context is changing. As factories automate, the people who continue to work in them need new skills, whether specific skills in computing, graphs or statistics, or more general skills in critical and creative thinking, or team decision-making. At the same time there is an increased demand for credentials, for certification. Jobs that would not have demanded a high school diploma some years ago now require one. This is not necessarily because they need the specific skills taught in high school. Sometimes employers feel that staying in school, keeping to the rules and making it through the system demonstrates a steadiness and reliability which they want in their workers.

Illiteracy is blamed for most of the late twentieth century problems of the American economy. If workers were better educated, so the argument goes, American industry would be more competitive in the world economy.

It is clear that both education and credentials are unequally distributed in our society. The NAEP, for example, found that 'literacy abilities of people 21-25 years-old are unequally distributed by race and ethnic origin, and by socio-economic status, with many minorities and low-income adults demonstrating disproportionately low abilities.'[7] This has implications for full participation in citizenship in this country, as well as being important for employment.

This Tennessee study was undertaken to look at the distribution of education levels in Tennessee's counties, and to begin to examine the factors affecting that distribution. Behind the questions about how education skills are distributed today, and why they

have particular patterns, lie the bigger questions: What are the impacts of the changing global economy on Tennessee, and what are their implications for education?

ECONOMY

Global changes, Tennessee impacts

Nationally and globally, we are in the midst of major economic changes. Manufacturing industries are restructuring to meet greater international competitiveness. Many plants are automating, others are relocating to Third World countries where labor is cheaper. As a result, many lower skilled manufacturing jobs are being lost, and the jobs that are left in traditional industries will likely require increased educational background and skills.

These economic changes are resulting in significant displacement of workers from their jobs. The Bureau of the Census, in a special survey in 1986 estimated that each year from 1979 to 1984, about 2.3 million workers were displaced by major layoffs or plant closings.[8] This rate is probably continuing. Manufacturing was most heavily affected, accounting for 66 per cent of displaced workers—far out of proportion to their numbers in the workforce.

Tennessee is likely to be harder hit than most states because it is heavily dependent on the manufacturing sector. The 1989 *Economic Report to the Governor of the State of Tennessee* notes the continuing decline of manufacturing jobs in Tennessee over the past twenty years.[9] In 1969, manufacturing jobs were 36 percent of all state non-agricultural jobs (compared with 28.7 percent in the nation as a whole.) By 1988, this had declined to 24.3 percent (compared with 18.5 percent for the U.S.), and is projected to decline to 21.6 percent by 1997 (compared with 16.0 percent for the U.S.). Even as jobs decline, Tennessee is expected to continue to be more dependent on manufacturing jobs than the United States as a whole.

Many rural counties in particular have depended in the last fifty years upon manufacturing plants like textile mills and shirt factories. Like much of the South, Tennessee has developed a 'rural industrial' workforce. Forty-three percent of jobs in non-metropolitan Tennessee are in manufacturing—the highest percentage of any Southern state.[10]

As the textile and apparel industries show, national trends are having major impacts on Tennessee. The U.S. textile industry complex—comprising fiber, textile and apparel production—is the nation's largest nondurable goods manufacturer, and employs one in every nine manufacturing workers, just under 2 million in 1985.[11] While not as concentrated in Tennessee as in the Carolinas, locally these industries have been important sources of jobs. In many rural counties more than a quarter of all jobs were in textiles and apparel, and in some, like Fentress and Clay counties on the Cumberland Plateau, over 40 per cent of jobs in 1982 were in textiles.

National employment in textile and apparel dropped by an average of 2 percent per year from 1970 to 1983, and continues to fall. In the South, in absolute terms, 155,000 textile jobs were lost from 1970 to 1985. These job losses have hit hard in Tennessee as elsewhere. U.T.'s Center for Business and Economic Research (CBER) estimates that by 1997, the number of jobs in textiles in Tennessee will be two-thirds of 1960 levels.[12]

The decline of employment in textiles and apparel illustrates that in manufacturing generally. The overall changes may have significant implications for rural Tennessee. CBER indicates increased unemployment rates in Tennessee and the U.S. over time, 'an occurrence attributable to structural change which arises as certain sectors decline in relative importance, worker skills become obsolete and individuals lose jobs.'[13] Most displaced manufacturing workers are unlikely to find a job like their old one.

Nationally, the service sector is expanding to fill the job losses in manufacturing. However, locally, less is known about how the service sector will absorb displaced manufacturing workers. Rural areas in particular may suffer special problems, since many have a heavy dependence on manufacturing, and the new service jobs tend to be centered where population is concentrated.

Nationally and globally, we are in the midst of major economic changes. Manufacturing industries are restructuring to meet greater international competitiveness. Many plants are automating, others are relocating to Third World countries where labor is cheaper. As a result, many lower skilled manufacturing jobs are being lost, and the jobs that are left in traditional industries will likely require increased educational background and skills.

The types of jobs available within the service sector will also likely have an impact on displaced workers' potential to rejoin the workforce at comparable wages. The service sector is large and spans a wide range of wage levels, from minimum-wage fast-food jobs to high-priced financial consultants and physicians. Low-skill manufacturing workers are most likely to be absorbed at the low-pay end of the service sector

wage scale, and will experience a drop in pay from their former jobs. Gaventa's case-study of laid-off textile workers in Knoxville showed that a year after lay-off, a large majority of the workers had not found a full-time job, and most had taken a substantial cut in pay.[14]

As the Hudson Institute points out, service work may mean part-time work for many people.[15] In retail trade in 1986, the average work-week was only 29 hours, and in other service sector industries the average workweek is significantly shorter than in manufacturing.

Tennessee is also a rural state: 40 per cent of its total population is rural. Of its 95 counties 79 are over 50 per cent rural and 64 counties are over 60 per cent rural. Nationally there has been a resurgence in rural poverty in the 1980's, and there is evidence that the South has been particularly hard-hit.[16] As we will see later in this report, many of Tennessee's counties, particularly the rural ones, are poor.

Education

The 1980 Census indicates that the South as a region has the lowest education levels in the United States today: as the map in Figure 1 shows, all of the states in which more than 35 percent of adults lack a high school diploma are Southern. Tennessee is at the hard core of this area of low education: in its highest county (Williamson, on the affluent fringe of Nashville) over 30 per cent of adults lack a high school diploma. At the other end of the range (Hancock county, also the poorest in the state), over 70 per cent of adults lack a diploma. Hancock County may be extreme, but not alone. In 70 Tennessee counties, more than half of all adults lacked a high school diploma in 1980.

Such measures of educational attainment as years of schooling or the acquisition of a diploma, do not equate well with actual educational achievement or 'functional' literacy skills. Studies like the Adult Performance Level Project of the University of Texas, and the National Assessment of Educational Progress studies have shown substantial lack of functional competence even among high school graduates. So looking at educational attainment levels likely underestimates the extent of educational problems of adults in Tennessee.

The concern about low education levels in Tennessee is not generated because skills are actually declining. These may be no worse than they have ever

Figure 1

ADULTS WITHOUT A HIGH SCHOOL DIPLOMA
1980

source: U.S. Department of Education

been, and may even be better than in the past when it was less common for young people to stay in school through the twelfth grade. The concern about literacy levels among adults is generated rather by a change in the context: the demands of a changing economy and changing jobs.

Education and Jobs

When manufacturing was the mainstay of the Tennessee economy, and generated large numbers of relatively low-skilled jobs, low educational achievement was probably not a major barrier to Tennessee economic development (although its impact on individuals may well have been significant). Companies locating in Tennessee were looking, among other things, for low wage costs, non-union and compliant labor. If they needed skills it was the kind that dexterous rural people could supply. However, nationally and in Tennessee, the economy is changing, and we need to develop an understanding of how educational needs will also change.

A future in which everyone can be creative and think for themselves is an appealing one. However, the realities of the job market may belie the dream. The large numbers of low skill jobs which will continue cannot be ignored.

It is commonly argued that better educational skills are going to become more important to economic growth. Education directed at both basic skills and job-related skills is being urged by a variety of national policy groups. Retraining of workers still in the workforce is advocated, in order to keep their skills in line with changing technologies. Retraining of displaced workers is urged, in order to hasten their rejoining the workforce, and increase their wage levels once they do get another job.

This retraining encompasses not only job-related skills but also basic literacy skills. A Bureau of the Census survey of 1986 found that 32 percent of displaced workers were high school dropouts, suggesting a significant level of need for remedial education in this population.[17] The popular literature suggests that employers commonly find educational deficiencies among their workers when they introduce a new technology demanding new skills. At that point they may choose to retrain their workers or relocate.

However, we know that most retraining programs, for employed or displaced workers, currently reach only a small proportion of those in most need. The Office of Technology Assessment (OTA) estimates that: 'In general, better educated workers receive a disproportionately large share of the training.'[18] Those who did not have a high school diploma made up 23 percent of the workforce in 1981, but only five percent of the trainees in that year.

Education and training are commonly presented as the answer to the problems of global competitiveness of the American economy. In stressing the importance of education, some may argue that lack of education and lack of training are the 'cause' of lack of economic competitiveness. A Southern Growth Policies Board *Alert*, for example, holds that not only is 'Illiteracy in the South's work force ... clearly a barrier to improved economic opportunities for its people,' but also that the region's high illiteracy rates 'inhibit entrepreneurism and discourage business expansion in and relocation to the region.'[19]

There are two main schools of thought on the relationship between education and economic development. One argues that education is a necessary condition for job creation and economic growth. The other argues that economic activity creates jobs, and that education is not an effective tool for development.

Education may be a necessary condition for economic growth.

The restructuring of the American economy which is underway leads many to suggest that even higher educational skills are going to be required of future workers in the United States. For example, Robert Reich in his recent report, argues that we need to train a cadre of workers who can think for themselves and work cooperatively, in order to meet the demands of the changing economy.[20] We also need a larger population of productive workers in order to support a growing population of retirees. 'Raising the lowest achievers to minimal levels of productive competence is a large part of the challenge of American education in the next economy.'

A future in which everyone can be creative and think for themselves is an appealing one. However, the realities of the job market may belie the dream. The large numbers of low skill jobs which will continue cannot be ignored. The fast growing jobs (which may still be relatively small in number) must be distinguished from the slow growth or declining jobs (which may nevertheless have the largest numbers.)

The *Workforce 2000* report from the Hudson Institute suggests 'Among the fastest growing jobs, the trend toward higher educational requirements is striking.'[21] However, the fastest growing jobs will not necessarily provide the majority of jobs by the year 2000, or beyond. While the high percentage growth is in high skill jobs, the greatest numbers will still be lower skilled. The Bureau of Labor Statistics estimates that the economy is creating nine cashier jobs for every computer programmer.[22]

Education is not a determinant of economic growth.

On the other side, there are arguments that increased literacy per se is not a determinant in economic development. David Harman, for example, in his study for the Business Center on Effective Literacy, states bluntly 'literacy does not produce jobs; that is achieved through economic activity.'[23] Historians like Harvey Graff argue that historically, literacy has followed industrial development rather than being a precursor.

Harman distinguishes between the impact of literacy on community economic development, and that on individuals. At the community level, he says, if functional illiteracy were to be wiped out, 'it is unlikely that any but very marginal effects would occur in the labor market. Economic and not educational determinants influence the shape of the market and the directions of employee flow.'[24]

Increased literacy, however, may have very significant impact on individuals. This may be especially important at a time of radical restructuring of the economy. Workers displaced from lower skilled manufacturing jobs may face significant periods of unemployment, and long-term reductions in wages and benefits, because they lack the skills to compete for any but the lowest paid service jobs. In that context, remedial education and retraining may become important factors enabling people to join or rejoin the workforce.

Education may be a necessary but not sufficient condition for growth.

The arguments that literacy education and job retraining are necessary today because of changing technology and industrial restructuring are persuasive ones. We may suggest that in today's world, education may contribute to some forms of economic development as a necessary but not sufficient condition. However, there is not enough understanding of how to maximize the potential for education and training programs to contribute to economic development.

Participation in such programs is not necessarily job-oriented. Adults participate in literacy and adult basic education programs for a variety of individual reasons, among which jobs may not be the most important. Getting a job may not be a significant incentive for someone with very low reading levels, because of the long time-commitment it would take to substantially increase skill levels. There has been little research to confirm that retraining does indeed enable workers to get better jobs. Indeed, the experience with JTPA displaced worker programs is that after retraining, workers often get jobs that pay less than their old ones.[25]

Many questions are left unanswered for Tennessee. Where are the manufacturing jobs which are being affected by restructuring? What are the existing educational levels in these communities? What are the education levels in the areas of economic growth, primarily the metropolitan counties? How are social and economic inequalities associated with education, and what are their implications for change in this area? How can we develop a better understanding of how many factors interact in complex ways, in order to develop strategic plans for action?

These questions initiated the research on which this report is based. We do not have all the answers, but we have a better picture of the current situation in Tennessee, and a clearer sense of further questions and further research that needs to be done.

NOTES

[1]*Governing*, April 1989: 74.

[2]Richard Venezky, Carl Kaestle and Andrew Sum, *The Subtle Danger: Reflections on the Literacy Abilities of America's Young Adults*, Center for the Assessment of Educational Progress, Educational Testing Service, Report No. 16-CAEP-01, January 1987.

[3] Forrest Chisman, *Jump Start: The Federal Role in Adult Literacy*, Southport Institute for Policy Analysis, January 1989:iv.

[4]This definition is used by the Young Adult Literacy Assessment, part of the National Assessment of Education Progress (NAEP). See Venezky, Kaestle and Sum, 1987.

[5]Carman St. John Hunter and David Harman, *Adult Literacy in the United States*, 1985 edition.

[6]Hudson Institute, *Workforce 2000: Work and Workers for the 21st Century*, June 1987.

[7]Venezky, Kaestle and Sum, 1987:3.

[8]U.S. General Accounting Office, *Dislocated Workers: Extent of Business Closures, Layoffs, and the Public and Private Response*, July 1986.

[9]Center for Business and Economic Research, University of Tennessee, published by the Tennessee State Planning Office, January 1989:44.

[10]Southern Growth Policies Board, *Making Connections: After the Factories Revisited*, 1989 Appendix D.

[11]Office of Technology Assessment, *The U.S. Textile and Apparel Industry: A Revolution in Progress, Special Report*, April 1987.

[12]Center for Business and Economic Research, 1989:44.

[13]*Ibid.*:46.

[14]John Gaventa, 'From the Mountains to the Maquiladoras: A case study of capital flight and its impact on workers', Highlander Center, 1988.

[15]*Ibid.*

[16]See, for example, Lionel J. Beaulieu, ed., *The Rural South in Crisis: Challenges for the Future*, London: Westview Press, 1988.

[17]U.S. General Accounting Office, 1986:27.

[18]Office of Technology Assessment of the U.S.Congress, *Technology and Structural Unemployment: Re-employing Displaced Adults*, Report No. OTA-ITE-250, 1986.

[19]Southern Growth Policies Board, *Alert*, 1988:1.

[20]Robert Reich, *Education and the Next Economy*, report for the National Education Association, 1988:19.

[21]*Op cit.*:97.

[22]*New York Times*, 9/8/88.

[23]David Harman, *Turning Illiteracy Around: An Agenda for National Action*, Business Council on Effective Literacy, May 1985:11.

[24]*Ibid.*:11

[25]Of the workers who reported their earnings to the Bureau of the Census, 45 percent had taken a pay cut, and two thirds of those were earning less than 80 percent of their former income. Health insurance commonly is lost, as are pension benefits. GAO, *op.cit.*

Findings

INTRODUCTION

Our research uses data from a variety of sources. Although we view data on years of education as a poor substitute for data on actual literacy skills, we use this measure because it is the only education data available at the county level. It is based on U.S. Census sources, and is for 1980. Some of our other data are from the Census, others from Tennessee sources and more recent years. Each is described and referenced more fully in its appropriate section.

Most of the discussion relates to the 'means' (or averages) for different variables either for all counties or for specific groups of counties; and 'correlations' (degree of overlap) between two variables. These figures enable us to describe in broad terms groups of counties, and to show how different variables interrelate. We describe first the education characteristics of Tennessee counties, and then the correlations of a number of socio-economic variables.

All of the analysis is at the county level. We say 'counties with higher education levels have higher mean incomes.' We do not say 'people with higher education levels have higher incomes.' That would require a different kind of study.

EDUCATION

Education levels among adults are very unevenly distributed across Tennessee counties. The percentage of adults over 25 with a high school diploma ranges from just over 30 percent to over 70 percent. While state-wide, 56 percent of adults have a high school diploma, in 70 of Tennessee's 95 counties, more than half of all adults lack a high school diploma.

In order to understand how and why education levels are so unevenly distributed, we divided counties into three broad groups and looked at the pattern of socio-economic variables within and between these groups. We grouped those with 'high' levels of high school graduates among their adult populations in 1980 (more than 55 percent), those with 'medium' levels (40-54 percent) and those with 'low' levels of high school graduates (less than 40 percent.)[1]

There are significant differences in the characteristics of these groups of counties. The 'high' high school graduates counties are considerably more urban. On average 66 percent of their population lives in communities of 2,500 or more, compared with the average for all counties of 29 percent. They are more affluent (their average per capita income is $11,260, compared with an average for all counties of $8,707), and have slightly lower unemployment (average 5 percent, compared with the all- county average of almost 7 percent). The 'high' group of counties also has a higher black population than the state average (13 percent compared with 8 percent average for all counties).

In terms of jobs, they have much higher proportions of white collar workers (average proportion of executive, professional and administrative personnel is 22 percent, and of sales, technical and clerical personnel 30 percent, compared with averages of 15 and 22 percent for all counties). Their economic base is more diverse, with less dependence on manufacturing (on average 31 percent of the jobs available in the county, compared with 44 percent for all counties) and a greater proportion of the trade and service industries (trade average 23 percent, compared with 17 percent for all counties; service average 19 percent, compared with 12 percent for all counties).

The 'low' high school graduates counties contrast sharply in almost every characteristic. They are very rural (on average only 9 percent urban), much more white than the state average (averaging 3.5 percent non-white), and low income (average per capita income for these counties is only $6,764). Their unemployment rate is higher (averaging 8 percent, but going all the way up to 18 percent). Their economic base is less diversified than the 'high' counties. They are more dependent on manufacturing (average 47 percent) and/or government jobs (averaging 19 percent, compared with 16 percent for all counties, and ranging up to 40 percent of all jobs).

The 'medium' group of counties falls between the high and low groups on most variables, although it is more like the 'low' group in its jobs and industry profile than the high group. These 'medium' counties are also somewhat older than either the 'high' or 'low' group of counties.

To take our analysis a step further, we correlated each of the variables with each other, and looked especially at how each variable correlates with the percentage of high school graduates and adults with even lower educational levels (eight years or less of schooling, and less than 5 years). This gives us a better idea of how the variables are related.

In the discussion which follows we arrange the correlations into four major groups: personal income data (including per capita income, average weekly wages and percentage of families in poverty), population data (including urbanness, average age and racial composition), economic data (including industries, occupations and unemployment rate) and local tax and

school expenditures data (including the assessed value of property and the local portion of school spending).

PERSONAL INCOME DATA

Several of our variables reflect different ways of looking at the income of a county's population.

** Per capita income (1984) is the total annual income of every person in the county, from all sources (including not only wages and salaries but also other payments, like savings, social security, retirement and disability payments), divided by the total population of the county.

** Average weekly wage (1985) reflects what employers in a county pay their workers. These workers may live in a different county from that in which they work.

** The percentage of families living below the poverty level (1979) shows the proportion of people living at the bottom of the socio-economic scale. Families were defined by the Bureau of the Census as living below the poverty line in 1979 if their annual income was $4,723 for two persons and $7,412 for four persons.

These three variables are obviously interconnected, but shed different lights on the question of how personal income data and education levels interact. *Table 1. Personal Income Correlations*, summarizes how each of these variables correlates with all others.

Per capita Income

Income is clearly a key variable. Counties with higher income consistently tend to have higher proportions of high school graduates among their adult populations. They also have lower proportions of adults with less than eight years of schooling. Figure 2 shows the average income levels in the counties with 'high,' medium,' and 'low' proportions of high school graduates.

The linkage between income and education levels in Tennessee is most graphically illustrated by the two maps in Figure 3. The first shows the percentage of high school graduates by county. The second shows the income distribution by county. It is clear that the maps are close to identical, and that the poorest counties, all rural, also have the lowest proportions of high school graduates.

Income also relates closely to most of our other socio-economic variables. Table 1 paints a picture of higher income counties which have relatively high education levels, are more urban, have larger tax bases and spend more on schools. They have more white collar workers and more white collar industries like trade, services and finance. Unemployment is generally lower than average.

Counties like Williamson and Davidson, in the Nashville metropolitan area, are at the most extreme of this type. Davidson county, for example, is 98 percent urban, had an average per capita income of $12,895 in 1984 (state average is $8,707), and one of the lowest unemployment rates in the state, at just under 4 percent in October 1988. The percentage of adults with a high school diploma is among the highest in the state, at 66 percent. Its neighbor, Williamson county, was only 50 percent urban in 1980, but has experienced rapid population growth since then (at 24 percent the highest in the state). It is even more affluent than Davidson, with an average per capita income of $13,991. Williamson has 69 percent of adults with a high school diploma, the highest rate in Tennessee.

In contrast, low income counties tend to have low education levels, are rural, have smaller tax bases and lower school spending. They have more blue collar workers than average, are more likely to have manufacturing industries. Some of the very poorest counties, like Hancock, at the bottom of the list for most economic variables, have little else in the way of an employment

Table 1, Personal Income Correlations

	Per Capita Income	*Average wkly Wages*	*% Families in Poverty*
% H.S.Grads	0.855	0.748	-0.724
% 9-11 yrs	-0.623	-0.659	0.373
% 0-8 yrs	-0.820	-0.637	0.806
% 0-4 yrs	-0.733	-0.566	0.779
Av.Age(yrs)	0.070	-0.108	-0.131
% non-white	0.233	0.159	0.036
% urban	0.697	0.628	-0.510
% Pop Change	0.312	0.178	-0.303
PerCapIncome	1	0.689	-0.789
Av Wages	0.689	1	-0.573
AssessdValue	0.494	0.398	-0.213
% Fam/Pov	-0.789	-0.573	1
% Unemply	-0.348	-0.239	0.324
LocSchExpend	0.744	0.744	-0.564
% Exec/Prof	0.701	0.608	-0.440
% Sales/Tech	0.759	0.611	-0.546
% ServiceOcc	0.216	0.244	-0.014
% Prod/Craft	-0.631	-0.523	0.286
% Farm Occ	-0.535	-0.599	0.639
% Trans Occ	-0.506	-0.299	0.311
% Labor Occ	-0.265	-0.124	0.114
% Constr Ind	0.451	0.242	-0.376
% Manufg Ind	-0.267	-0.160	0.021
% Trans Ind	0.219	0.154	-0.079
% Trade Ind	0.400	0.233	-0.221
% Finance Ind	0.362	0.213	-0.151
% Service Ind	0.369	0.291	-0.204
% Govt	-0.442	-0.346	0.501

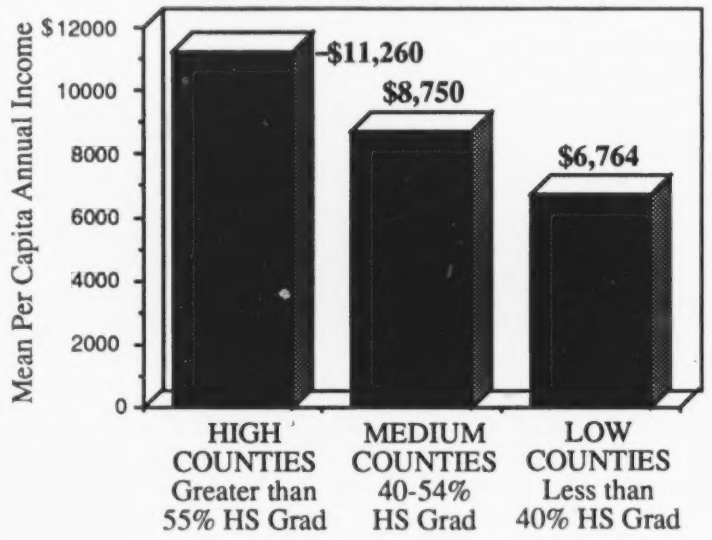
base, and tend to be very heavily dependent on government jobs.

In the eastern part of the state there are many low income counties like Campbell county. This county is predominantly white, has an average per capita income of $6,914, and an unemployment rate of 11.6 percent. Only 37 percent of adults in Campbell county have a high school diploma, and 31 percent have eight years or less of schooling.

The Southern Growth Policies Board's (SGPB) regional analysis, *Making Connections: After the Factories Revisited*, found close correlations between income growth and education levels.[2] The rate of income growth from 1981-85 in counties where more than 42 percent of adults had eighth grade education or below was less than one fifth of the income growth in counties where less than 24 percent of adults had eighth grade or lower education.

Figure 2

PERCENT HIGH SCHOOL GRADUATES* BY MEAN PER CAPITA INCOME**



* Adults 25 and over. Source: U. S. Census 1980

**Per capita income 1984. Source: Bureau of Economic Analysis

Wages

Wages also correlate closely with education levels, although somewhat less strongly than does income. Figure 4 shows the average weekly wage rates in the counties with 'high,' 'medium,' and 'low' proportions of high school graduates.

The average weekly wage reflects what companies located in the county pay their workers. This variable is a different concept from that of per capita income, and shows a somewhat different pattern because workers do not always live in the counties where their employers are located. In the East Tennessee Development District (ETDD), for example, 28.3 percent of workers commuted into another county in 1980.[3] In ETDD counties outside metropolitan areas, 36.8 percent of workers commuted to another county, and in some rural counties, like Grainger county, over half of all workers had to travel to another county to find employment.

Wage levels also correlate with other variables in much the same way as income does, although consistently at lower levels. Counties which are high-wage have more white collar jobs, and lower than average proportions of skilled production and craft workers. The high-wage counties are likely to have a higher than average proportion of service workers. Like high income areas they are more likely to be urban. As with per capita income, local spending on schools is strongly correlated with wage levels.

Poverty

The poverty level in a county correlates more strongly than does income level with the proportion of adults who have completed less than 5 years of school.

The percentage of families living below the poverty line in a county is another way of looking at personal income data at the county level. It does not correspond neatly with either per capita income or average wage levels, and indeed does not correlate quite as closely with percentage of high school graduates as does per capita income. Figure 5 shows the average poverty levels in the counties with 'high,' 'medium,' and 'low' proportions of high school graduates.

However, it is more closely associated with people who have very limited schooling (less than 5 years). We might expect that people with this limited schooling are at the bottom of the socio-economic scale, and most likely to live in poverty, and their presence in high proportions within a county would serve to increase the overall poverty level. Employment patterns are

Figure 3

ANNUAL PER CAPITA PERSONAL INCOME FOR 1986

source: Bureau of Economic Analysis

PERCENT OF ADULTS 25 YEARS OF AGE OR OLDER WITHOUT A HIGH SCHOOL OR GED DIPLOMA IN 1980

source: U.S. Census 1980

different in high poverty counties. The percentage of families in poverty correlates strongly with percent of government jobs in the county. This reinforces the point that the counties which have little else depend on government jobs. High poverty counties are more likely to have farm employees living in them or to have mining. The counties which have substantial proportions of production workers are lower income than average, but are not among those with the worst poverty rates.

High poverty counties are fairly stable in terms of population. There is a negative correlation between poverty rate and population change. This may be because they are more rural, and the population growth is happening in counties surrounding metropolitan areas. In Pickett county, for example, on the Cumberland Plateau, 30 percent of all families live below the poverty line. It is very rural, has a high unemployment rate (11 percent) and a high dependence on manufacturing jobs (65 percent). Only 36 percent of its adults have a high school diploma.

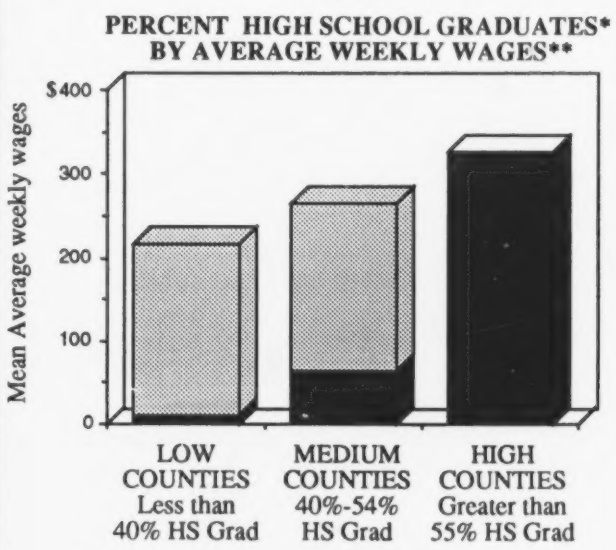
However, we should note that use of poverty percentages here clouds the fact that substantial *numbers* of urban families live in poverty. The percentages are lower in urban areas because of the even larger numbers of more affluent families in the same county. In Shelby county, for example, 15 percent of families live in poverty, but this amounts to 30,242 families. In contrast, in Hancock county, where almost 40 percent of families are below the poverty line, this amounts to only 782 families.

POPULATION DATA

We have several variables that describe the population of Tennessee counties in various ways.

** Urban (1980) is a measure of the proportion of the county's population which lives in communities of 2,500 or more people.[4]

Figure 4



Rural is defined as less than 40% urban
Urban is defined as more than 40% urban

* Adults 25 and over; source: U.S. Census 1980
** Average Weekly Wages for 1985;
source: Tennessee Statistical Abstract 1988

** Race (1980) measures the proportion of the county's population which is non-white. In Tennessee for the most part this means black or Afro-American.[5]

** Average age (1980) is self-explanatory.[6]

** Population change is an estimate of the percentage increase or decrease in population of each county from the last Census (1980) through 1986.[7]

Table 2, Population Data Correlations, shows how each of these variables correlate with the other variables in our database.

Urban

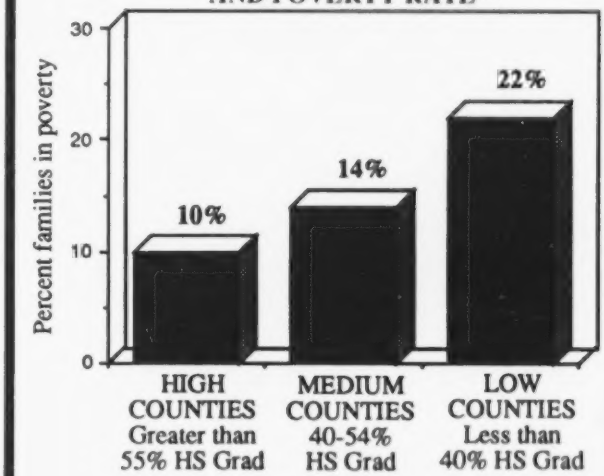
Tennessee is a rural state: 40 percent of its total population is rural. The more rural a county is, the more likely it will have a smaller proportion of high school graduates. As Figure 6 shows, the counties with the highest percentage of high school graduates average 66 percent urban; while the counties with the lowest percentage of high school graduates average 9 percent urban.

There are no Tennessee counties that are 100 percent urban: its major metropolitan areas of Davidson and Shelby counties (Nashville and Memphis) have 96 and 98 percent urban populations respectively, Hamilton county is 90 percent urban, while Knox county is 77 percent urban. On the other hand, Tennessee does have 24 counties that are 100 percent rural, and 79 counties that are over 50 percent rural. There are some clear differences between the more urban counties (those with 40 percent or more of their population living in communities of 2,500 or more people) and the more rural counties.

To see how counties group together around similar characteristics, we ran a cluster analysis on our data.[8] Among the clusters identified is an urban cluster of counties (averaging 40 percent urban). In this cluster on average 51 percent of adults have a high school diploma. In the most rural cluster (averaging only 9.5 percent urban) an average of 37 percent of adults have a high school diploma. In contrast, in the most urban counties in the state, 66 percent of adults are high school graduates.

Figure 7 shows the education distribution of some sample counties: Davidson county, whose pattern is very similar to the most metropolitan counties; Madison county,

Figure 5



* Adults 25 and over. Source: U. S. Census 1980
**Percent of all families below the poverty level 1979
Source: Bureau of Census, 1979

Table 2, Population Data Correlations

	% Urban	*% Population Change 80-86*	*% Non-white*	*Average Age*
% H.S. Grads	0.774	0.433	0.266	-0.201
% 9-11 yrs	-0.697	-0.387	-0.291	0.369
% 0-8 yrs	-0.647	-0.364	-0.186	0.033
% 0-4 yrs	-0.615	-0.273	-0.058	-0.056
Av. Age (yrs)	-0.176	-0.327	-0.313	1
% non-white	-0.359	-0.099	1	-0.313
% urban	1	0.103	0.359	-0.176
% Pop Change	0.103	1	-0.099	-0.327
PerCapIncome	0.697	0.312	0.233	0.070
Av Wages	0.628	0.178	0.159	-0.108
AssessValue	0.627	0.004	0.356	-0.199
%Fam/Pov	-0.510	-0.303	0.036	-0.131
% Unemploy	-0.302	-0.232	-0.193	0.049
LocSchExpend	0.730	0.140	0.098	-0.014
%Exec/Prof	0.766	0.388	0.264	-0.266
%Sales/Tech	0.815	0.374	0.347	-0.26
%ServiceOcc	0.324	0.086	0.519	-0.313
%Prod/Craft	-0.714	-0.339	-0.489	0.369
%FarmOcc	-0.597	-0.241	0.026	0.126
%TransOcc	-0.477	-0.115	-0.267	-0.054
%LaborOcc	-0.304	-0.261	-0.152	0.023
%Constr Ind	0.395	0.317	0.164	-0.168
%Manufg Ind	-0.466	-0.137	-0.283	0.269
%Trans Ind	0.352	-0.071	0.154	-0.159
%Trade Ind	0.618	0.059	0.365	-0.161
%Finance Ind	0.371	0.300	0.216	-0.124
%Service Ind	0.477	0.184	0.103	-0.037
%Govt	-0.378	-0.106	0.025	-0.237

whose pattern typifies many 'medium urban' counties; and Johnson county, whose pattern is typical of many very rural counties.

'Ruralness' is clearly a key factor influencing not only education but many other aspects of life in Tennessee counties. The more urban a county is, the more it is likely to be higher in per capita income and wages, lower in poverty families. The cluster of counties containing Davidson and Shelby, for example, which is 97 percent urban, has a mean per capita income of $12,443, while the most rural cluster has a mean per capita income of $6,453. The large cluster of 'medium urban' counties, with a mean of 40 percent urban, has a mean per capita income of $9,984, above the state average.

More urban counties are likely to have both higher assessed property value and higher local spending on schools. The more urban counties on the whole have lower unemployment levels, lower proportions of production workers, and higher proportions of white collar and executive workers. They are likely to have a more diverse economic base, with less manufacturing industry, less dependence on government jobs, and more trade, service and finance jobs.

Rural counties on the other hand, on the whole are poorer, have more unemployment and more dependence on manufacturing. In all the rural counties, education levels and per capita income are strongly correlated. Within the 24 counties which are 100 percent rural, income correlates even more strongly with education levels, especially at the level of adults with eight years or less of school.

The rural counties spend less local funds on education, and have less to spend, since their property tax base is lower. They also consistently have smaller percentages of high school graduates and higher proportions of adults with eight years or less of school. There are some very rural counties in west Tennessee with comparatively high black populations (like Fayette

county, outside Memphis, with a 51 percent black population). However, on the whole, the most rural counties in the state are the most white, and the average black population for counties which are 60 percent or more rural is only 6 percent.

The Southern Growth Policies Board's *Making Connections* report suggests that ruralness combined with education level has a strong explanatory value for economic growth. The 83 non-metropolitan counties in the South which had the highest education levels had more than twice the employment growth between 1977-1984 (2.81 percent annually), as the 118 counties with the lowest education levels (1.34 percent annually.)[9]

Population change

Population growth is correlated with higher proportions of high school graduates and lower proportions of adults with less than eighth grade education, although it does not correlate with them as strongly as many other variables in our study.

This measure estimates population change in a county from the 1980 Census through 1986. The counties that grew substantially in population (more than 10 percent growth) in this period tend to be adjacent to metropolitan areas. Williamson county is the most extreme example, with a population growth of 24% in six years. An exception is Cumberland county (with an 11 percent growth rate), where the growth may reflect a large retirement and second homes community. The growth areas on the whole are booming economically, and this is reflected in their correlations.

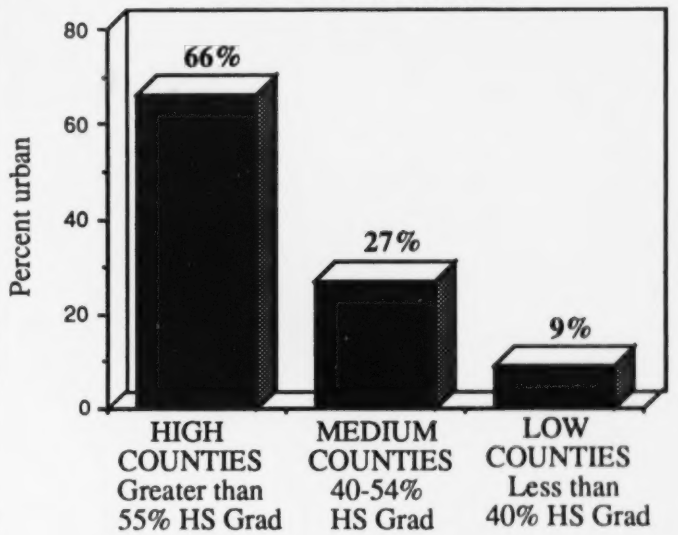
Race

We find race less strongly correlated with the education measures than many other variables. Race is weakly correlated with the percentage of high school graduates, and with the percentage of adults with some high school education. Race is not significantly correlated with the percentage of adults with the two lowest education levels, eight or fewer years of education or less than five years.

Figure 8 illustrates the average population of non-whites in the three groups of counties: 'high,' 'medium,' and 'low' percentage of high school graduates. The highest education level counties have an average non-white population of 13 percent, while the lowest education level counties have an average non-white population of only 4 percent.

Figure 6

PERCENT HIGH SCHOOL GRADUATES * AND PERCENT POPULATION LIVING IN URBAN AREAS**



*Adults 25 and over. Source: U. S. Census 1980

**Percent of population living in communities of 2,500 or more,1980. Source: TN Statistical Abstract, 1988

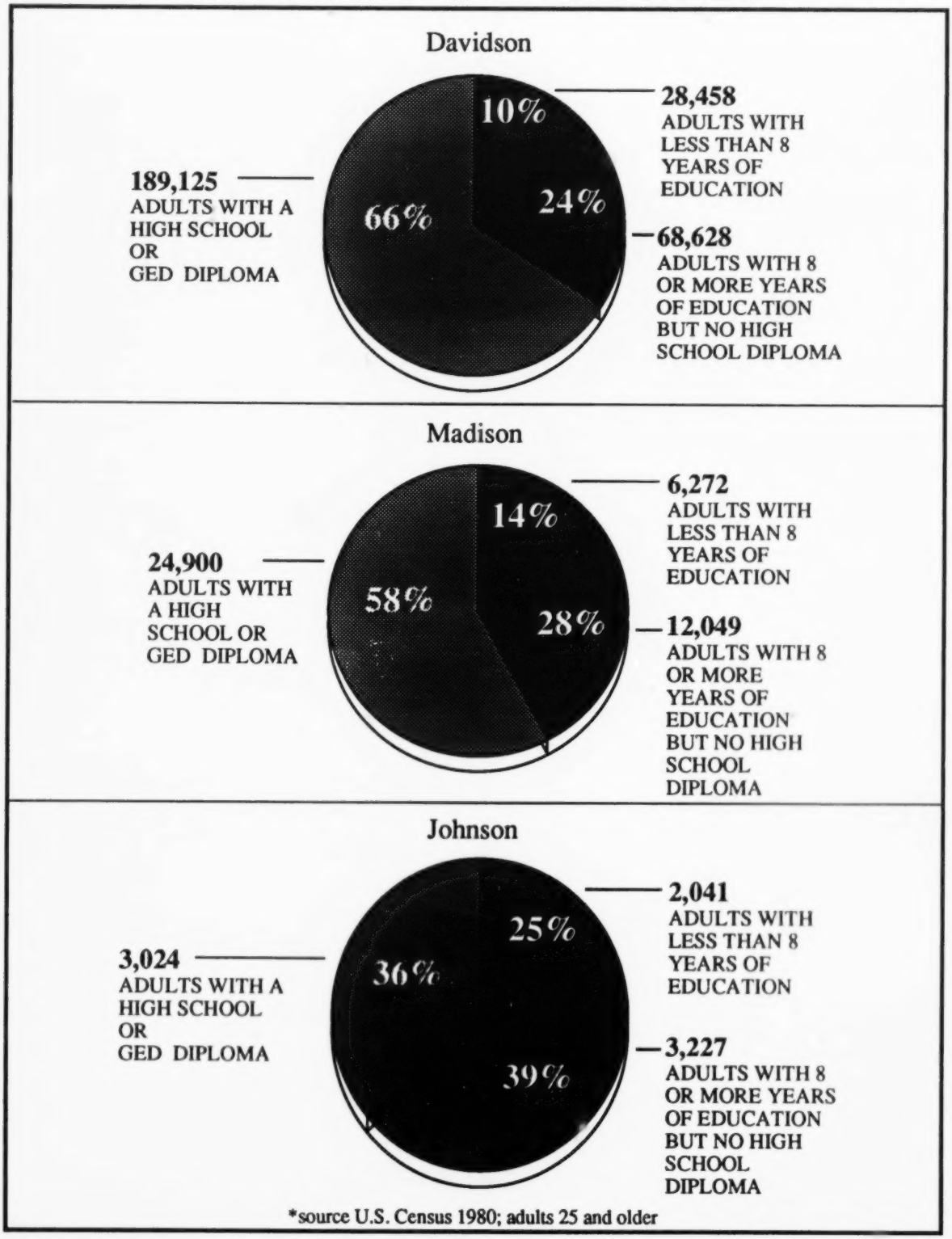
Because our analysis is at the county level, and not at the individual level, and because no Tennessee county is much more than 50 percent non-white, our findings do not give race the credit it probably deserves in accounting for educational attainment. We know from the SGPB analysis across the South, that race is a primary variable in education, as well as in employment growth. However, counties with black populations higher than the mean for all Tennessee counties (8 percent) average 51 percent of adults with a high school diploma (compared with a mean for all counties of 46 percent).

To illustrate the limits of our analysis, we show race not correlated at all with the poverty rate. The numbers of black families in the state who we know do live in poverty is masked at the county level by the concentration of blacks in urban counties where there are sufficiently affluent white populations to mask the extent of black poverty; and by the high concentrations of white poverty in rural east Tennessee counties.

In our study, counties with a higher black population have rather higher per capita incomes than the average ($9,730, compared with $8,707) and are more urban (44 percent, compared with an average of 29

Figure 7

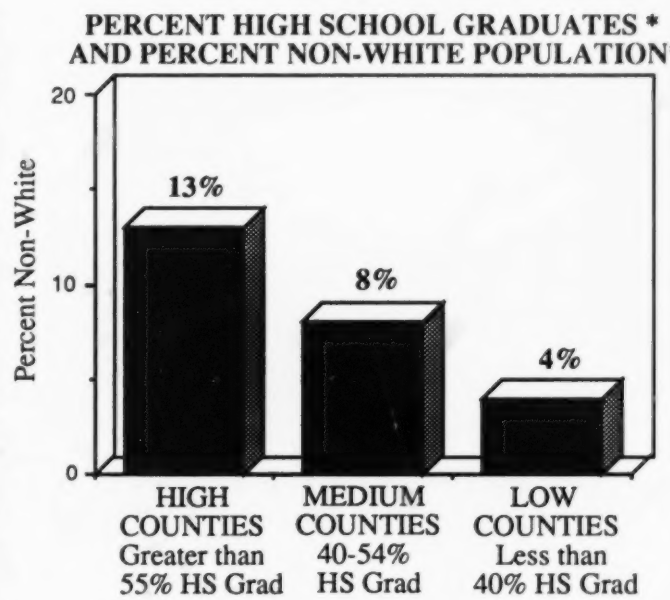
EDUCATION LEVELS FOR SELECTED COUNTIES*



*source U.S. Census 1980; adults 25 and older

percent). They are somewhat higher than average in white collar personnel and service workers, and less likely to have production workers. Again, this probably reflects as much the more urban character of many high black counties as the actual occupations of black workers in Tennessee. Nevertheless, there are some differences between all urban counties and the counties that have the highest proportion of blacks. The counties with higher black population do not have as high a proportion of white collar workers as do all urban areas, nor as high income levels.

Figure 8



* Adults 25 and over. Source: U. S. Census 1980
**Percent non-white population, 1980 Source: Healthy Tennesseans, TN Dept. of Public Health, 1983.

Age

We know for the state as a whole, as Figure 9 shows, there is a clear distribution of years of schooling by age. Older people are less likely to have completed the full twelve years of formal education, and more likely to have less than five years of schooling. In our county analysis, age correlates with the proportion of adults with some high school education, but less than a high school diploma or GED. It is not strongly correlated with the proportion of adults with the lowest educational levels, below fifth grade, although the statewide data leads one to expect that it would be.

As with race, the county level data probably does not give age its full significance for high school graduation level.

Older-aged counties are somewhat less likely to be black, and are more likely to be stable in population, as average age is negatively correlated with population change. They are not more clearly rural, or lower income than younger counties. They do, however, tend to have higher percentages of production workers. Fayette county is an example of one that is significantly younger than average, with an average age of 27.3 years, compared with the statewide average of 31.2. Stewart county has the oldest population in the state, with an average age of 35.1. However, at 42 percent and 40 percent respectively, their proportion of high school graduates is quite close.

ECONOMIC BASE

We may look at the economic base of a community through a number of measures, including employment by industry, distribution of occupations, and unemployment rate.

** Industry data (1985) identifies the primary economic and industrial base of a county.[10] The measure shows most of the jobs available in a county. We note again that the workers who hold these jobs may live in adjacent counties. We grouped the industrial classification initially into 9 groups, but since a number of the categories (like mining, agriculture, finance) are very small, we report here on what appear to be key industrial categories: manufacturing, construction, and trade and services sectors.[11]

** Occupations data (1980) describes the occupations of workers who live in the county (regardless of where they actually work).[12] We grouped the thirteen categories into 7 main groups, and report here on four key occupational groups.[13]

** Unemployment data (October 1988).[14]

These variables are connected among themselves, but each give a different angle on the question of how a county's economic base interacts with its education levels. *Table 3, Industry Correlations*, and *Table 4, Occupation Correlations*, show how all these variables correlate with each other and with the income and population data.

Figure 9

YEARS OF EDUCATION BY AGE

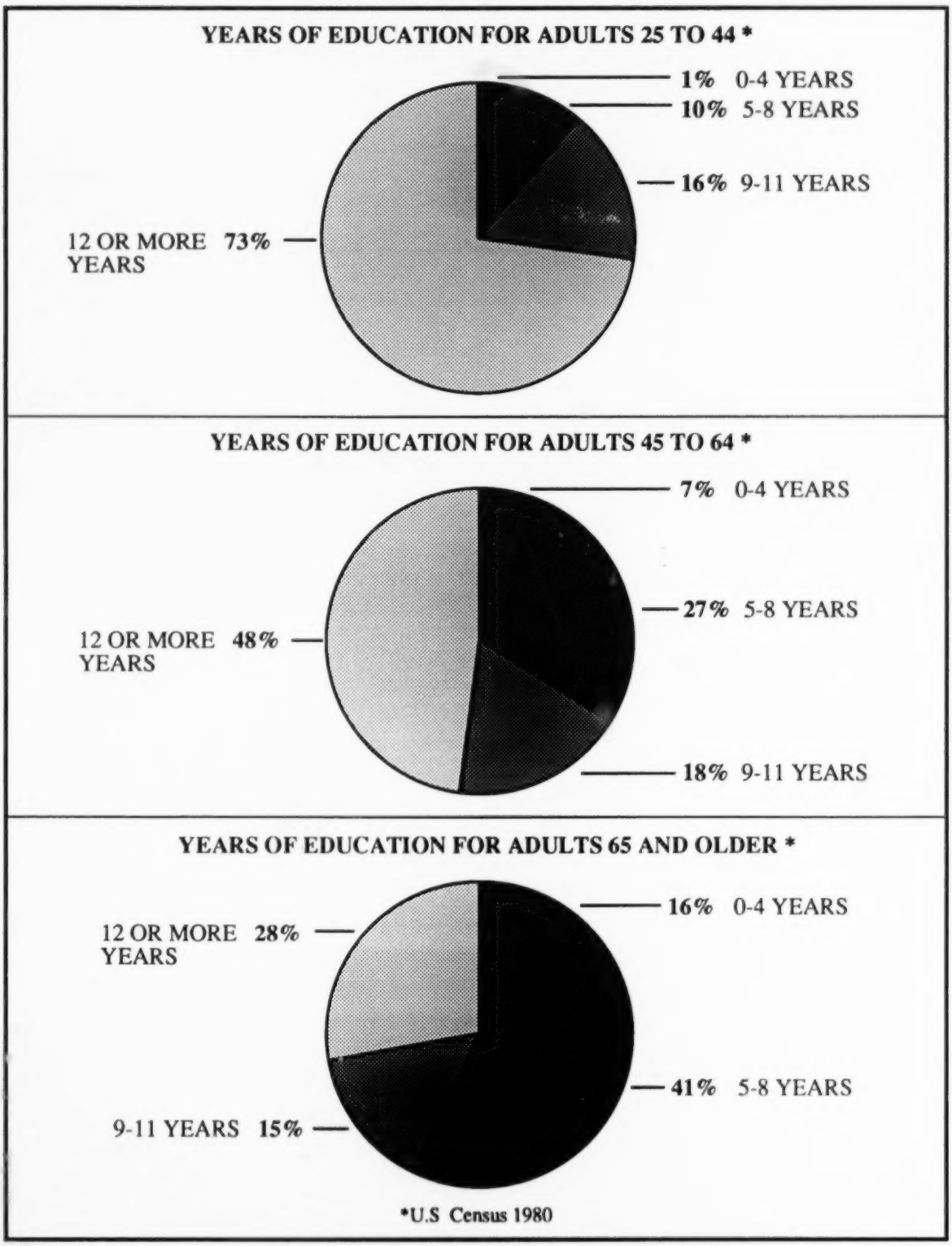

YEARS OF EDUCATION FOR ADULTS 25 TO 44 *
1% 0-4 YEARS
10% 5-8 YEARS
16% 9-11 YEARS
12 OR MORE YEARS 73%
YEARS OF EDUCATION FOR ADULTS 45 TO 64 *
7% 0-4 YEARS
27% 5-8 YEARS
12 OR MORE YEARS 48%
18% 9-11 YEARS
YEARS OF EDUCATION FOR ADULTS 65 AND OLDER *
16% 0-4 YEARS
12 OR MORE YEARS 28%
41% 5-8 YEARS
9-11 YEARS 15%
*U.S Census 1980

Table 3, Industry Correlations

	% Constr Ind	*% Manuf Ind*	*% Trade Ind*	*% Service Ind*	*% Unemply*
% H.S. Grads	0.466	-0.388	0.492	0.468	-0.388
% 9-11 yrs	-0.340	0.454	-0.476	-0.459	0.360
% 0-8 yrs	-0.447	0.249	-0.388	-0.364	0.317
% 0-4 yrs	-0.401	0.191	-0.314	-0.337	0.238
Av. Age (yrs)	-0.168	0.269	-0.161	-0.037	0.049
% non-white	0.164	-0.283	0.365	0.103	-0.193
% urban	0.395	-0.466	0.618	0.477	-0.302
% Pop Change	0.317	-0.137	0.059	0.184	-0.232
PerCapIncome	0.451	-0.267	0.400	0.369	-0.348
Av Wages	0.242	-0.160	0.233	0.291	-0.239
AssessedValue	0.203	-0.457	0.446	0.409	-0.208
%Fam/Pov	-0.376	0.021	-0.221	-0.204	0.324
% Unemploy	-0.304	0.230	-0.155	-0.276	1
LocSchExpend	0.218	-0.299	0.410	0.402	-0.231
%Exec/Prof	0.455	-0.534	0.531	0.588	-0.376
%Sales/Tech	0.542	-0.591	0.648	0.560	-0.405
%ServiceOcc	0.146	-0.537	0.479	0.398	-0.280
%Prod/Craft	-0.472	0.709	-0.665	-0.586	0.427
%FarmOcc	-0.326	0.268	-0.400	-0.348	0.121
%TransOcc	-0.214	0.199	-0.257	-0.359	0.233
%LaborOcc	-0.208	0.170	-0.144	-0.266	0.319
%Constr Ind	1	-0.525	0.475	0.280	-0.304
%Manufg Ind	-0.525	1	-0.777	-0.698	0.230
%Trans Ind	0.227	-0.363	0.225	0.189	-0.027
%Trade Ind	0.475	-0.777	1	0.501	-0.155
%Finance Ind	0.391	-0.567	0.454	0.373	-0.136
%Service Ind	0.280	-0.698	0.501	1	-0.276
%Govt	-0.130	-0.191	-0.173	-0.238	0.060

Industry

Figure 10 shows the pattern of industries in the three groups of counties: those with 'high,' 'medium,' and 'low' proportions of high school graduates. There are clear differences in the patterns between the three groups of counties.

Manufacturing industry:

The presence of a high proportion of manufacturing industry in a county on the whole has negative implications for education. The more manufacturing, the fewer high school graduates, and the more people with some high school education but no diploma. However, manufacturing counties tend not to have the highest proportions of those at the lowest educational levels, less than eighth grade or less than fifth grade education. The requirements of skilled and semi-skilled factory work in the past has seemed to encourage less than optimal education levels.

Manufacturing is of particular interest because of the national changes in this sector (see Introduction). We find that counties with a high proportion of manufacturing jobs in Tennessee are likely to be less urban, to have lower income levels and higher unemployment. Manufacturing is negatively correlated with trade and service jobs and with construction jobs, suggesting that the bulk of the industry is more rural. As one might expect, manufacturing counties also have high proportions of skilled production and craft workers. They have lower proportions of executive, sales and service personnel.

We may surmise the biggest educational crunch is happening in the counties with a heavy dependence on manufacturing. As manufacturing work generally is increasing in skill demands on its workers, there is more need for higher education levels than have been needed in the past.

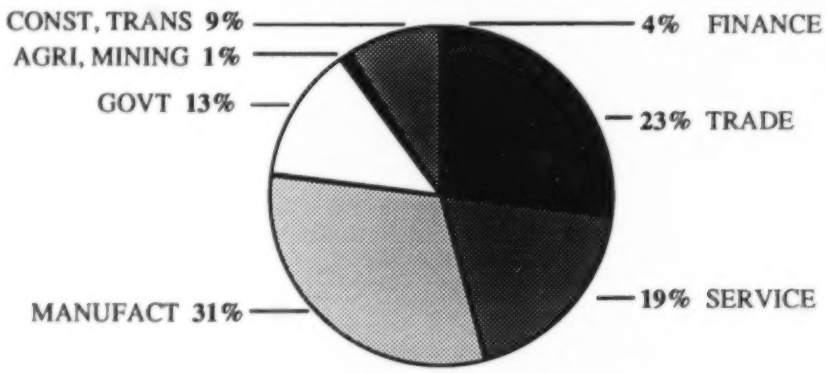
Construction industry:

The construction industry in many ways serves as a barometer of economic health. The counties which have a substantial construction industry are the counties which are growing, in industry and population. They tend to be more

Figure 10

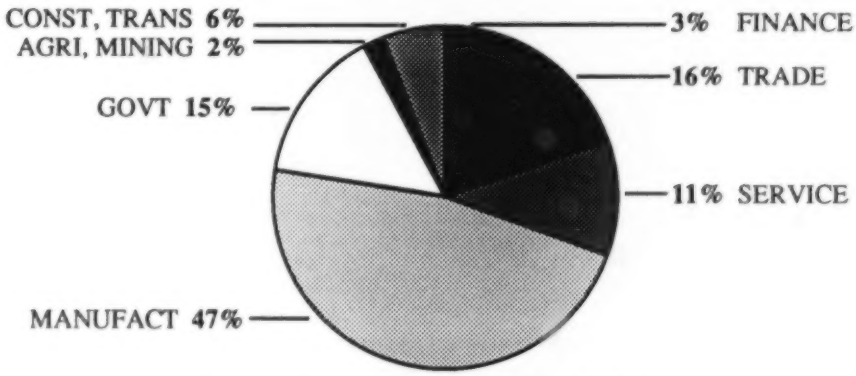
INDUSTRY MIX FOR COUNTIES GROUPED BY PERCENT OF HIGH SCHOOL GRADUATES

INDUSTRY AVERAGES FOR "HIGH" COUNTIES *



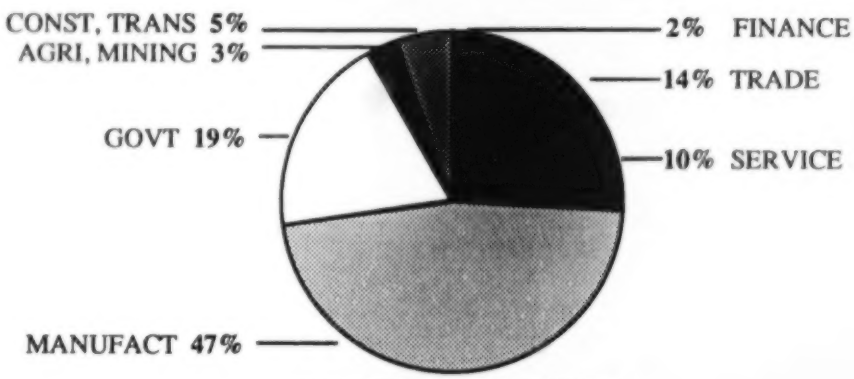
*high school graduates greater than 55%

INDUSTRY AVERAGES FOR "MEDIUM" COUNTIES *



*high school graduates greater than 40% and less than 55%

INDUSTRY AVERAGES FOR "LOW" COUNTIES *



*high school graduates less than 40%

*Tennessee Covered Employment 1985

Table 4, Occupation Correlations

	% Exec/Prof/ Admin	% Sales/Tech Clerical	% Service	% Skill/Semi-Prod/Craft	% Labor/Help
% H.S. Grads	0.835	0.856	0.322	-0.737	-0.360
% 9-11 yrs	-0.807	-0.748	-0.370	0.751	0.329
% 0-8 yrs	-0.659	-0.732	-0.213	-0.554	-0.297
% 0-4 yrs	-0.564	-0.656	-0.086	0.428	0.240
Av. Age (yrs)	-0.266	-0.226	-0.313	0.369	0.023
% non-white	0.264	0.347	0.519	-0.489	-0.152
% urban	0.766	0.815	0.324	-0.714	-0.303
% Pop Change	0.388	0.374	0.086	-0.339	-0.261
PerCapIncome	0.701	0.759	0.216	-0.631	-0.265
Av Wages	0.608	0.611	0.244	-0.523	-0.124
AssessedValue	0.590	0.612	0.263	-0.619	-0.217
%Fam/Pov	-0.440	-0.546	-0.014	0.286	0.114
% Unemploy	-0.376	-0.405	-0.280	0.427	0.319
LocSchExpend	0.729	0.720	0.195	-0.615	-0.232
%Exec/Prof	1	0.871	0.364	-0.865	-0.425
%Sales/Tech	0.871	1	0.417	-0.891	-0.449
%ServiceOcc	0.364	0.417	1	-0.599	-0.278
%Prod/Craft	-0.865	-0.891	-0.599	1	0.330
%FarmOcc	-0.613	-0.617	-0.213	0.409	0.052
%TransOcc	-0.503	-0.509	-0.271	0.417	0.423
%LaborOcc	-0.425	-0.449	-0.278	0.330	1
%Constr Ind	0.455	0.543	0.146	-0.472	-0.208
%Manufg Ind	-0.534	-0.591	-0.537	0.709	0.170
%Trans Ind	0.273	0.324	0.079	-0.340	0.049
%Trade Ind	0.531	0.648	0.479	-0.665	-0.144
%Finance Ind	0.422	0.518	0.310	-0.506	-0.265
%Service Ind	0.588	0.560	0.397	-0.587	-0.266
%Govt	-0.311	-0.311	0.101	0.118	0.125

urban, or at least metropolitan, they have lower unemployment and higher income levels, higher proportions of executive and sales personnel and lower proportions of production workers. And, as one might expect to follow from that, construction is positively correlated with percent high school graduates and negatively with the lowest education levels.

Trade and service industry:

Trade and service industry correlate very similarly with the education variables. Both are moderately correlated with percent high school graduates, and negatively with the lowest education levels.

Two key differences between trade and services are that trade is much more strongly correlated with degree of urbanness and with the construction industry. Both are correlated with higher income, with higher assessed property value, with more executive and sales personnel, and with lower proportions of production workers.

Occupation

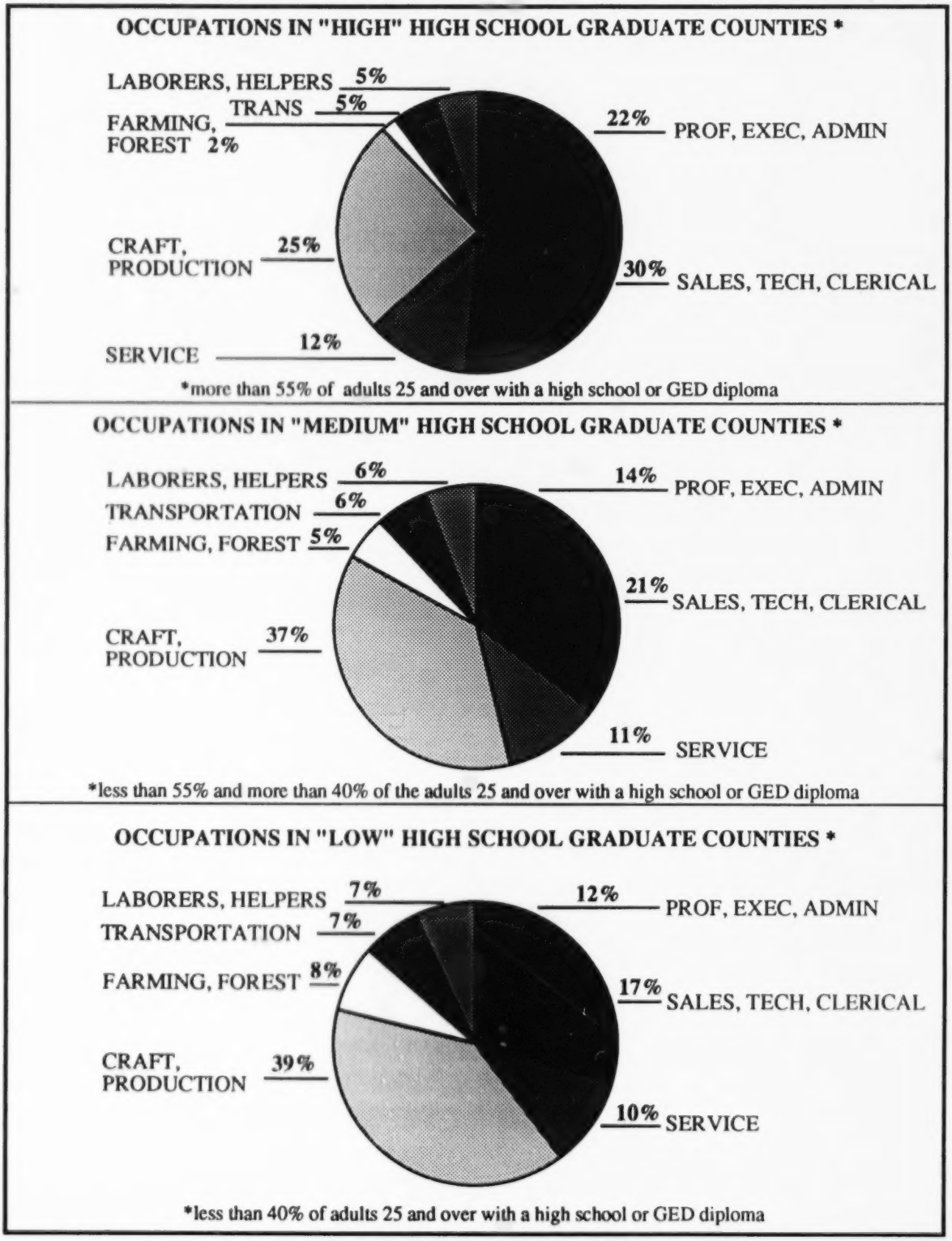
As we might expect, the occupational mix of a county correlates strongly with its education levels. When we combine the two white collar occupation groups the combined variable correlates more strongly with percent of high school graduates than any other. The higher the proportion of executives and sales people, the higher the proportion of high school graduates, and the lower the proportion of those at the bottom of the educational scale, those with less than 5 years of formal education.

Figure 11 shows the occupational mix of the counties with the 'high,' 'medium,' and 'low' proportions of high school graduates. Clearly there are significant differences in the patterns of the three groups of counties.

It is also clear also from our correlations, that production workers for the most part do not live in the same counties as executive and sales personnel, since they are very strongly negatively correlated. Interestingly, production workers are also somewhat nega-

Figure 11

OCCUPATION MIX FOR COUNTIES GROUPED BY PERCENT OF HIGH SCHOOL GRADUATES


OCCUPATIONS IN "HIGH" HIGH SCHOOL GRADUATE COUNTIES *
LABORERS, HELPERS 5%
FARMING, TRANS 5%
FOREST 2%
CRAFT, 25%
PRODUCTION
SERVICE 12%
22% PROF, EXEC, ADMIN
30% SALES, TECH, CLERICAL
*more than 55% of adults 25 and over with a high school or GED diploma
OCCUPATIONS IN "MEDIUM" HIGH SCHOOL GRADUATE COUNTIES *
LABORERS, HELPERS 6%
TRANSPORTATION 6%
FARMING, FOREST 5%
CRAFT, 37%
PRODUCTION
14% PROF, EXEC, ADMIN
21% SALES, TECH, CLERICAL
11% SERVICE
*less than 55% and more than 40% of the adults 25 and over with a high school or GED diploma
OCCUPATIONS IN "LOW" HIGH SCHOOL GRADUATE COUNTIES *
LABORERS, HELPERS 7%
TRANSPORTATION 7%
FARMING, FOREST 8%
CRAFT, 39%
PRODUCTION
12% PROF, EXEC, ADMIN
17% SALES, TECH, CLERICAL
10% SERVICE
*less than 40% of adults 25 and over with a high school or GED diploma

*Computed from the U.S. Census 1980

tively correlated with service workers, perhaps reflecting the strong tendency for more production workers to live in rural areas and a parallel tendency for more service workers to live where their jobs are: in urban centers.

Counties with a high proportion of production workers, and to a lesser extent laborers, tend to have more unemployment. These counties also have a lower tax base and lower local spending on schools. Both income and wages are significantly lower in counties with a high proportion of production workers.

Counties with high proportions of executive and sales people are almost the opposite of those in which production workers predominate. They are more urban, have higher incomes and wages. They tend to have higher assessed values, gaining them a substantially larger property tax base, and in turn higher local spending on schools.

Unemployment

We can see a tendency for counties with lower unemployment rates to be ones with higher proportions of high school graduates, and counties with higher unemployment to have higher proportions of adults with the lowest education levels.

Unemployment (as of October 1988) does not correlate with education levels as strongly as a number of other variables. It is a volatile variable, and educational levels reflect longer-term and slower changing variables. Johnson county, for example, with an unemployment rate of 18 percent, had 36 percent of adults with a high school diploma. In contrast, another rural county, Houston, with an unemployment rate of 9 percent had 46 percent of adults with a high school diploma.

Unemployment is also positively correlated with percent production workers. This appears to reflect the continuing decline of manufacturing industry in Tennessee as well as nationally.

TAX BASE AND LOCAL EDUCATION SPENDING

The local property tax base and the local share of spending on schools are separate but connected.

** The assessed value of property in a county (1985) reflects the taxable value of property in the county.[15]

** The local contribution to total expenditures per pupil in average daily attendance (1985-86) reflects that portion of a school system's per pupil spending that is provided from local funds.[16] State and federal funds make up the balance of the total school budget. Property tax is the major source of these local funds in most counties. Where more than one school system exists in a county, we have averaged their combined spending per pupil.

We find positive correlations both between the assessed value of a county and the proportion of high school graduates, and between local spending on education and percent high school graduates. Local spending on education also correlates, though a little less strongly, with the proportion of adults with the lowest education, less than 5 years.

Counties with higher assessed value have a larger property tax base, and therefore are able to provide increased services to residents. They may not necessarily do so.[17] Among those services one would expect to find educational services, and to find higher local spending per pupil. Counties with larger tax bases do tend to spend more on schools, and the correlation is quite strong. *Table 5, Local Tax Base Correlations*, shows the correlations between both these variables and others in our analysis.

Table 5, Local Tax Base Correlations

	Assessd Prop Value	*Local School Expenditure*
% H.S. Grads	0.541	0.739
% 9-11 yrs	-0.526	-0.673
% 0-8 yrs	-0.424	-0.613
% 0-4 yrs	-0.360	-0.544
Average age	-0.199	-0.014
% non-white	0.356	0.098
% urban	0.627	0.730
% Pop Change	0.004	0.140
PerCapIncome	0.494	0.744
Av Wages	0.398	0.744
AssessedValue	1	0.668
%Fam/Pov	-0.213	-0.563
% Unemploy	-0.208	-0.231
LocSchExpend	0.668	1
%Exec/Prof	0.590	0.729
%Sales/Tech	0.612	0.720
%ServiceOcc	0.263	0.195
%Prod/Craft	-0.619	-0.615
%FarmOcc	-0.380	-0.624
%TransOcc	-0.239	-0.346
%LaborOcc	-0.217	-0.232
%Constr Inc	0.203	0.218
%Manufg Ind	-0.457	-0.300
%Trans Ind	0.477	0.230
%Trade Ind	0.446	0.410
%Finance Ind	0.412	0.353
%Service Ind	0.409	0.402
%Govt	-0.141	-0.383

Figure 12 shows the average local share of per pupil expenditures in the three groups of counties: those with 'high,' 'medium,' and 'low' proportions of high school graduates. The average spending for the 'high' education group of counties is close to twice that

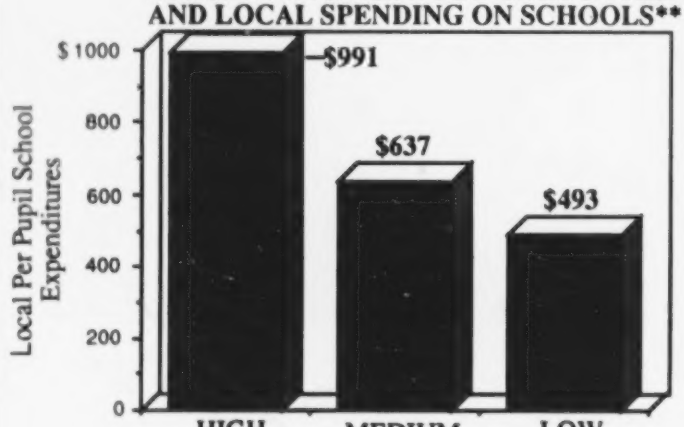
of the average spending in the 'low' education group.

There is a tremendous range in the local share of per pupil spending on schools across the state. The county with the highest local spending on schools (Davidson) spends $1,904 per pupil, ten times as much as the county with the lowest (Hancock) at $194 per pupil. The difference is only partly compensated by federal funding, and the state share of school spending is in theory equal across the state. The net effect is that the counties which make a larger local contribution to school spending also have a larger total school spending.

The counties with higher local spending on schools also have other characteristics. They are more urban. Local spending is strongly correlated with higher proportions of executive and sales personnel, and negatively with proportion of skilled production and craft workers. They are also higher in income. All of these characteristics are also strongly associated with higher education levels, so we cannot point to school spending alone as being the crucial factor. Nevertheless, we may see assessed value and local spending on schools as linked variables which mediate between the affluence of a community and education levels among its adults.

Figure 12

PERCENT HIGH SCHOOL GRADUATES* AND LOCAL SPENDING ON SCHOOLS**



* Adults 25 and over. Source: U. S. Census 1980

**Local expenditures per pupil in average daily attendance, 1985-1986 school year. Source: TN Education Association, Basic Facts of School Finance in Tennessee, 1987

JOBS, EDUCATION AND INCOME

It is clear from our findings that most of the variables we looked at are linked in a complex web of interrelationships. In order to try to identify the most important variables, to identify which would be the best predictors of education levels, we ran a statistical technique called regression analysis. This technique sorts through a number of variables to identify the most important predictors.[18]

Percent adult high school graduates:

First we sought to identify the most important variables explaining the percentage of high school graduates in Tennessee counties. We found the most important variable was the percentage of the combined white collar occupations (percent executive, professional and administrative personnel, plus percent sales, technical and clerical personnel). This variable accounted for 77 percent of the variation in the percentage of high school graduates in all 95 counties in Tennessee. Other significant factors are the poverty rate (accounting for 10 percent) and wage levels (accounting for 2 percent).

It is possible that, in different types of counties, different factors are at work, so we ran similar regressions for counties with more than the state mean of black population and for counties which are more white than the mean, and also for more rural and more urban counties. For the counties with higher black populations (8 percent or more), the pattern was very similar to that for all counties. Again, the percentage of white collar occupations was the key variable, accounting for 85 percent of the variation. Poverty rate explained 5 percent, and wages one percent. In these counties, average age (1 percent) and assessed value of property (1 percent) also were factors.

In contrast, in the mainly white counties, (less than 8 percent non-white), income became the key variable, accounting for 69 percent of variance in high school graduates. It pushes the white collar occupational group to second place, with 12 percent, and poverty (4 percent) and wage (one percent) follow. In

these counties, race is also a factor, accounting for only one percent of variation, but nevertheless surprising since these counties have, by definition, very small non-white populations.

Percent adults with 8 years or less of school:

We also ran a regression for all counties on the percentage of adults at the bottom education level, those with eight years or less of formal education. In this regression we found per capita income to be the key variable, explaining 67 percent of the variance in this education level. Percent poverty (7 percent), and percent white collar personnel (5 percent) also contribute to the variance, as does local spending on schools (one percent).

Education, jobs and income:

The regression analyses suggest that of the many variables of our study, jobs and income are the most important predictors of education levels, both of the percentage of adult high school graduates and the proportion of adults with eight years or less of school. The analysis finds jobs, income and education to be closely interwoven factors in Tennessee life. We can expect changes in any one of these variables will have effects on the others. We cannot say that increasing education levels will result in more white collar jobs and higher incomes. We can say that the counties which have the most white collar workers and the highest incomes also have the highest education levels.

No doubt other factors also contribute to this situation. The urban centers which have the better-paying jobs also attract more migrants, and we know that nationally, the more mobile people are the better educated they tend to be. These counties also spend more on education, and have greater resources to spend.

Our research does not indicate easy solutions to the problems of education in Tennessee: but if such did exist, they would no doubt have been applied long ago. Our findings do indicate that we are dealing with complex interactions, in which many factors work together. The solutions we devise should recognize the complexity and take a multi-faceted approach.

NOTES

[1]Source: U.S. Bureau of the Census, 1980.

[2]Southern Growth Policies Board, *Making Connections*, 1989:44.

[3]East Tennessee Development District, *Socio-economic Report, 1960-1980*, August 1986.

[4]U.S. Census 1980.

[5]*Ibid.*

[6]*Ibid.*

[7]Source: *Tennessee Statistical Abstract* 1988.

[8]We used FASTCLUS on SAS.

[9]*Op Cit.*, 1989:44.

[10]Tennessee Department of Employment Security, *Tennessee Covered Employment and Wages by Industry, State and County*, 1984-85. This is based on reports from employers of all jobs covered by unemployment insurance.

[11]The 11 categories are as follows:

Construction; Manufacturing; Transportation/Utilities; Trade; Finance; Service; Government; Agriculture/Forestry; Mining.

[12]Based on data from Bureau of the Census, reported in *Tennessee Statistical Abstract*, 1988.

[13]Our occupation categories are as follows:

1. Executive, Professional and Administrative;
2. Sales, Technical and Clerical;
3. Service (includes private household, food service, childcare workers and so on, and protective services (fire, police, guards.)
4. Skilled and semi-skilled production and craft (includes mechanics, machinists, miners, machine workers and machine operators);
5. Laborers and helpers;
6. Farm (includes farming, forestry and fishing);
7. Transportation (includes drivers and crane/dozer operators).

[14]As reported by Tennessee Department of Employment Security, *Labor Force Estimates Survey*, 1988.

[15]Source: Tennessee Educational Association, *Basic Facts of School Finance in Tennessee, 1987*.

[16]*Ibid.*

[17]Tennessee Advisory Commission on Intergovernmental Relations (TACIR) has published a report on *Fiscal Effort, Fiscal Capacity and Fiscal Disparities among Local Governments in Tennessee*. March 1988. This indicates that on the whole, counties with low fiscal capacity do tend to have low per pupil expenditures, while counties with high fiscal capacity tend to have high per pupil expenditures.

[18]We used the Stepwise procedure of SAS.

Conclusions

The research has left us with some answers to our original questions, and some new questions. Education levels are very unequally distributed in Tennessee, and clearly closely linked with the distribution of jobs and income. Education is important. It is a factor in Tennessee's growth and development. This research cannot show causal relationships. This study cannot say that lack of education causes communities to be low income, or to lack white collar jobs, or to have a narrow economic base. Neither can we say that the opposite is the case: that being poor, or a blue collar community causes education levels to be low. But we can say that these factors are associated.

We need further research to untangle the complex web of social, economic and educational variables, in order to understand where intervention might make a difference. This research needs to be both at the macro-level, continuing the process of working with statewide data, and at the micro-level, conducting case-studies in particular communities. Almost no-one is asking the people involved, those who have semi-skilled jobs, the unemployed, those who live in poor rural counties, what needs to be done to address their and their community's needs; We need to understand what education means to them, what would enable them and encourage them to take part.

A logical conclusion from this study is that we cannot expect economic development activities to be successful if they pay no attention to adult education, especially in the least educated rural areas. We can no longer expect to simply create jobs in isolation from other social interventions. Neither can we expect to focus all our attention on education, with the hope that somehow jobs will result. Rather, state and local policies must be multi-faceted, address educational and social and economic needs together in a coherent way.

Tennessee has lagged behind other states in making the switch from the economic development strategy popularly known as 'smokestack chasing'—based on the recruitment of outside industries, to a new strategy being called 'bootstrapping'—based on development of local resources for growth from within. Today there may be more interest in developing local resources including 'human capital' than in the past, and education may have a more important role to play in Tennessee than ever before. The climate is ready for new public policies that seek to address economic development needs in a multi-faceted way, through education as well as job creation, retraining as well as recruitment of new industry.

It is time that educators and those involved in economic development worked together to assess what kinds of jobs will exist in Tennessee in the future, what skills they will really need, and what the current workforce skills are. Such a study could provide a more sound basis for strategic development of training and education for Tennessee workers, and for those who are not in the workforce but who could be.

As an example, this study suggests that a particular focus of educational effort may need to be in the areas which have the heaviest dependence on manufacturing jobs. If those industries are to stay in the state, they are likely to automate, which may mean fewer jobs but higher skilled ones. Without the workforce skills, the industries may choose instead the low labor-cost option of relocating overseas.

We also need critically to evaluate the long-term effects of different kinds of basic education and training. Do they fulfill their promise of enabling workers to get better jobs? What kinds of education and training make sense for Tennessee's workers?

Educators have a responsibility to urge that the economic imperative not drive us toward narrowly focussed job-skill education. We should not simply train workers in specific job skills. Job requirements are changing fast, and such skills would soon be outdated. We need a more broad-based approach which teaches basic skills but goes beyond. We should be teaching people to learn how to learn, so that they can continue to adapt to changing contexts. We need creative and critical thinking skills, so that all our human resources make full contributions to their work and communities.

Such an approach to education can do more than enabling people to fit into the demands of employers. We can see the potential for people to become actors in their local economy, to help shape economic growth and revitalization in their communities. This kind of education might, in fact, create jobs, through developing local resources and skills, and developing entrepreneurship.

We should not make promises we cannot keep. We cannot expect to 'eradicate illiteracy', but we can expect to work toward establishing an environment for all Tennesseans in which education is encouraged, facilitated and valued. We cannot expect education on its own to solve economic problems, but neither can we expect job creation to work without any improvement in education skills. We should expect education and training programs to work in tandem.

Above all, as educators we have a responsibility to insist that we do not only need workers. We need citizens who are able to take a full part in the social and political, as well as economic life of their communities and their state.

The Center for Literacy Studies is an inter-disciplinary research center at The University of Tennessee. Housed in the College of Education, the Center's overall goal is to initiate and encourage research in many fields to further our understanding of adult literacy. We seek to provide a more firm basis on which policy and programmatic decisions may be made.

Research projects address the context and implications of literacy for our society, as well as developing more appropriate and effective basic skills education methods for adults, and evaluation of the effectiveness of different approaches, methods and programs.

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